ITLE: SINK COMPOUND LAMINATE MODELING PROCESS

BACKGROUND OF THE INVENTION

(a) Field of the Invention

The present invention is related to a modeling process for sink compound laminate, and more particularly, to one that achieves integrated heterogeneous alloy of copper and aluminum by diffused lamination to the interface between both metal materials into a given profile for taking advantage of highly efficient heat conduction property of the copper section to conduct at the first time the heat from the heat source to the entire aluminum section that covers up the copper section to dissipate the heat by the profile of the aluminum section.

(b) Description of the Prior Art:

Sinks in PCs or desktop computers generally available in the market are provided in types of extruded aluminum, CNC integrated aluminum cast and copper, and copper fin laminated to copper base sheet. Wherein, the aluminum alloy sink though featuring lightweight, has poor heat conduction efficiency and fails to at the first time conduct the heat from the heat source to the entire aluminum sink. Copper alloy gives better heat conduction property, but it is found defectives of being heavy and requires a comparatively complex process.

In an earlier improvement made by this author, a casting process involving heterogeneous metals was used for the manufacturing of copper and aluminum integrated sink base sheet to take advantage of the high heat conduction property of the copper sheet to fast conduct the heat from the heat source to the entire sink to dissipate the heat by the sink profile of the aluminum alloy provide on the top of the copper sheet for

significantly upgrading the sink efficiency while providing at the same time the high efficiency of heat conduction by copper and the lightweight feature of the aluminum alloy.

However, in the casing process, the aluminum alloy is in a semi-fusion (atomized) status to be bound to copper. The binding force is comparatively weak between those two heterogeneous metals and the stripping strength is insufficient.

SUMMARY OF THE INVENTION

The primary purpose of the present invention is to provide a sink compound laminate molding process. Wherein, a gravity casting process is used to directly pour the melting aluminum into the surface of copper, which has been already heated up to 300~650℃. Activities of the copper and aluminum are high enough to easily produce chemical binding reaction as chemical compounds in branch structure can be leached from copper to react with aluminum and the branch structure of the chemical compound covers up the peripheral of the crystals of aluminum resulting in diffused binding to significantly improve the binding force between copper and aluminum.

Another purpose of the present invention is to provided a sink compound laminate molding process that an inert gas is injected into the molding cavity during the preheating process of the copper or the molding cavity is in a vacuumed status to prevent oxidization from the surface of copper.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic view showing the structure of the compound laminate of the present invention.

Fig. 2 is a process flow chart of the present invention.

Fig. 3 is a blowup view of the interface between copper

and aluminum bound by using the process of the present invention.

Fig. 4 is a blowup view of the aluminum crystals completed with the binding using the process of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is related to a sink compound laminate molding process. Referring to Fig. 1, a compound laminate (1) is provided with a net profile defined by an aluminum material (12) with a copper material (11) bound to the bottom of the net profile of the aluminum material (12) so that when the sink molded from the compound laminate (1) contacts a heat source with the copper material (11), the high heat conduction property of the copper material (11) fast conducts the heat to the aluminum material (12) covering up the copper material (11) for the profile of the aluminum material (12) on top of the copper material (11) to dissipate the heat.

Now referring to Fig. 2 for the molding process of the present invention, wherein, the process includes the following steps:

Step 1: Prepare sheet copper material in a thickness of 0.1~8.0 mm depending on the profile of the sink;

Step 2: Place the copper material in the molding cavity to such extent that the bottom of the copper material completely bound to the bottom layer of the molding cavity;

Step 3: The copper material is heated up to 360~650℃ and an inert gas is injected into the molding cavity or the molding cavity is maintained in vacuumed status to prevent oxidization taking place on the surface of the copper material; and

Step 4: The melting aluminum material is poured into the molding cavity using a gravity casting process to create a diffused binding to the interface between both of the copper

and aluminum materials.

Finally, the aluminum material is cooled down and cured to avail a structure of a compound laminate of an integrated heterogeneous alloy of copper and aluminum in a given profile. Wherein, the distribution of crystals on the copper/aluminum interface as illustrated in Fig. 3, the segment marked with Area One relates to the area of copper materials, Area 2, the aluminum area; and Area 3, the leached copper product indicating that certain part of copper will be leached out in the interface between the copper and aluminum materials during the gravity casting process for the aluminum material to tightly bind to the aluminum material. As illustrated in Fig. 4, the segment marked with Area (1) relates to aluminum crystals; and Area 2, leached copper product indicating that the leached copper is permeable along the interface of the aluminum crystals and further surrounding around the aluminum crystals to form a chemical compound in branch structure. Aluminum crystals are enclosed in the chemical compound in branch structure to produce diffused binding, and thus the significantly improved binding force between the copper and the aluminum materials.

Strict copper or copper alloy, and strict aluminum or any aluminum alloy selected from a group comprised of AlSiCu, AlSiZn, AlSiMg, AlSiCuMg, AlGe, AlGeSi, AlCu, AlMn, AlMg, AlLi, AlSn, and AlPb respectively for the copper and aluminum materials in the present invention. Table 1 lists physical properties of copper and aluminum that may serve for the diffused binding. In general, the copper is heated to 500~1100℃ to be pre-oxidized into melting status to proceed binding with the melting aluminum. Before the operation, it should be confirmed that the oxygen differential pressure and the binding temperature are

respectively at their critical points, and that the binding temperature is at the eutectic temperature instead of the melting point of copper at 1083℃.

The present invention adopts the gravity casting process to directly pour the melting aluminum material into the surface of the copper material preheated to 300~650℃. Both of the copper and the aluminum materials are at their high activities to generate chemical reaction for the copper materials to be leached out to react with the aluminum material and to produce a chemical compound in branch structure; in turn, aluminum crystals are enclosed by the chemical compound in branch structure to yield diffused binding, and thus to significantly improve the binding force between the copper and the aluminum materials. As a result, the finished product of the sink provides excellent heat dissipation performance while the process features low production cost and easy process to be comprehensively applied in the production of various types of sink. Therefore, this application is duly filed accordingly.